

REMARKS/ARGUMENTS

Examiner Isaac is thanked for the continued thorough Search and Examination of the Subject Application for Patent.

Reconsideration of the Rejection of Claims 1-19 under 35 U.S.C. 103(a) as being unpatentable over Wang (U.S. Pat. No. 6,461,932 B1) in view of Klein (U.S. Pat. No. 6,511,576 B2) is requested. Claims 1-19 describe methods of planarizing substrates having trenches formed therein. A layer of dielectric is formed on the substrate thereby filling the trenches with the dielectric. A layer of resist is then formed on the layer of dielectric. The substrate is then planarized by removing all of the layer of resist and part of the layer of dielectric using only chemical mechanical polishing with a hard polishing pad, a hardness of at least Shore "D" 52. Key limitations of the methods of Claims 1-19 are "forming a layer of resist on said layer of trench dielectric; providing a polishing pad having a hardness of at least Shore "D" 52; and removing all of said layer of resist and part of said layer of trench dielectric using said polishing pad and chemical mechanical polishing". A polishing pad with a hardness of at least Shore "D" 52 is used to remove the combined layer of resist and dielectric. Using a polishing pad with a hardness of at least Shore "D" 52 is an important part of Claims 1-19 because this insures that the layer of resist and dielectric is removed without leaving scratch marks on the remaining trench dielectric, any base dielectric on the surface of the substrate, or on the surface of the dielectric if there is no base dielectric on the substrate, see the Specification

page 9, lines 9-17 and page 11, lines 8-15. Softer polishing pads will leave scratch marks when used to remove a layer of resist and dielectric.

Wang describes a method of forming isolation trenches for shallow trench isolation. Wang describes the use of a smoothening layer over a layer of dielectric filling a trench. The smoothening layer and the dielectric above the top of the trench are then removed using chemical mechanical polishing. The smoothening materials described by Wang are spin-on-glass, borophosphosilicate glass, phosphosilicate glass, and potentially borosilicate glass, see column 6, lines 46-51. The method described by Wang requires that the composition of the slurry used in the chemical mechanical polishing and the chemical composition of the dielectric layer are such that the rate of removal of the smoothening material is close to the rate of removal of the dielectric layer, see column 7, lines 54-64. Wang does not describe the use of resist as a smoothening material as is described in Claims 1-19. Most importantly, Wang does not describe the use of a very hard polishing pad, at least Shore "D" 52, to remove the layer of smoothening material and dielectric, which is a key limitation of Claims 1-19.

Klein describes a method for planarizing substrates having apertures formed therein using chemical mechanical polishing. Conductive layers are formed in the apertures to form capacitors. Filler material is used to fill the apertures prior to planarization of the substrate to restrict material from entering the apertures, see column 3, lines 50-63. Klein describes the use of a photoresistant material in the form of a gel that can be removed with an etchant as a filler material, see column 5, lines 24-32. The

photoresistant gel described by Klein is different from the resist material described in Claims 1-19, the use of the photoresistant gel as a filler material described by Klein is different from the use of resist as a smoothing material described in Claims 1-19. The key limitation of Claims 1-19 which is the use of a polishing pad having a hardness of at least Shore "D" 52 is not described nor suggested by Klein. Klein does not make the use of resist as a smoothing material as is described in Claims 1-19 an obvious extension of Wang because the photoresistant gel described by Klein is different from the resist described in Claims 1-19 and the use of the photoresistant gel described by Klein is different from the use of the resist described in Claims 1-19. Klein does not make the key limitation of Claims 1-19, the use of a very hard polishing pad having a hardness of at least Shore "D" 52 to remove the layer of smoothing material and dielectric, an obvious extension of Wang.

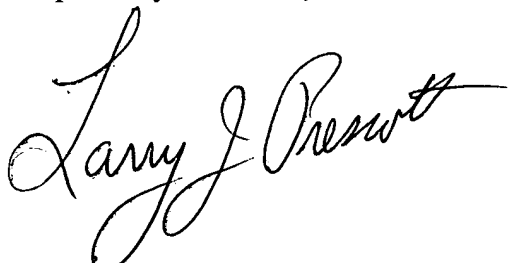
We wish to emphasize that the Specification on page 9, lines 9-15 recites "One of the key features of this invention is that the polishing pad 32 is very hard having a hardness of at least Shore "D" 52. This hard polishing pad planarizes the wafer without leaving scratch marks on the remaining trench dielectric 18, any base dielectric 11 on the surface of the substrate 10, or the surface of the substrate 10 if there is no base dielectric 11 used on the substrate 10." The Specification on page 11, lines 8-13 further recites "In this embodiment, as in the preceding embodiment, a key to the invention is that the polishing pad 32, see Fig. 6, is very hard having a hardness of at least Shore "D" 52. This hard polishing pad planarizes the wafer without leaving scratch marks on the remaining trench dielectric 18 or on the surface of the substrate 10."

It is believed that Claims 1-19 are different from and not obvious from Wang in view of Klein because of the key limitations of Claims 1-19 of "forming a layer of resist on said layer of trench dielectric; providing a polishing pad having a hardness of at least Shore "D" 52; and removing all of said layer of resist and part of said layer of trench dielectric using said polishing pad and chemical mechanical polishing".

Reconsideration of the Rejection of Claims 1-19 under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Klein, and allowance of Claims 1-19, are requested.

It is requested that should Examiner Isaac not find that the Claims are now Allowable that the Examiner call the undersigned Agent at (845)-462-5363 to overcome any problems preventing allowance.

Respectfully submitted,

A handwritten signature in cursive script, reading "Larry J. Prescott". The signature is written in black ink and is positioned above the printed name.

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